

# **Saffron: issues in international marketing**

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## Introduction

Saffron has been mentioned as a potential crop in Nepal and the Kingdom of Bhutan. Most of the comments have been based on the apparent similarity of the two countries' geographic and agro-climatic conditions with Kashmir. Saffron has the additional attraction of being the highest priced spices in the world.

As a first step to understanding the marketing potential of saffron in the two countries, an analysis was made of the trade data on saffron within the International Trade Centre in Geneva. In examining that data a number of anomalies arose.

Within the limits of the data and its associated anomalies, this paper presents some marketing comments on saffron.

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### 1. Producing saffron

Saffron is produced from *Crocus sativus*, syn. *C.sativus var. autumnalis*, and *C.autumnalis*, a member of the lily family.

Saffron crocus is sterile with planing occurring by splitting newer corms from the body and hand transplanting.

Each saffron crocus plant produces up to three flowers. Each flower has three stigmas that, after drying, becomes commercial saffron. Some claim it takes about 240,000 stigmas to make a kilogram of saffron whilst others claim the figure is more towards 500 000 stigmas. An experienced picker will take around 12 days to pick this.

Harvesting occurs when the flower starts to bloom and the red saffron strand exposed. This happens over three to four weeks in October and November in the Northern Hemisphere and March to April in the Southern Hemisphere. During this period the plant blooms continuously.

Technically, saffron grows best between 6°C - 19°C degrees centigrade with an annual precipitation of 0.1 to 1.1 meter and a soil pH of 5.8 to 7.8 that is well drained and of medium fertility.

By all accounts Iran is centre of global production but Kashmiri saffron is viewed as the centre of quality production.

Kashmir saffron is produced from *Crocus cashmirianus*. Kashmir's suitability for the production of saffron is due to its cool autumns and considerable seasonal variations in temperature.

Production is sensitive to natural conditions. In Iran, around 90 percent of production is from Khorassan province in the east contiguous with Afghanistan. Kerman, to the west of Khorassan, has around 6000 ha under saffron cultivation. In Khorassan in 2004, severe drought in the southern parts of the province has reduced the productivity of saffron farms from the average five kilograms per hectare to three<sup>1</sup>. Irrigation systems are needed to boost the yield to 20 kilogram per hectare. With this in mind, there are reports that Spain is

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<sup>1</sup> *Iran Daily*, 6 December 2004

experimenting with hydroponic production. It is considered this method allows for better control of quality.

Two terms are used. Stamen is the male part of the saffron plant with no culinary value. It is not considered true saffron. Stamen are bright yellow. They can be sold as a colouring agent for paint. Stigma is the female reproductive organ of the saffron plant. This is the heart of commercial saffron. Stigmas are bright red and look like thin red threads when dried. Whole saffron strands have naturally occurring yellow to white ends. They appear in saffron of lower quality.

Drying is critical to the production of commercial saffron. The flowers are picked, the red stigma removed and then dried. By cutting the stigmas apart prior to drying them, the "moisture" will evaporate out leaving none inside the saffron stigma. When the stigmas are attached to each other, moisture is trapped inside the stigma. Longer stigma usually means lower quality as there is a greater level of moisture retention. Moisture shortens the shelf life of the end product and lowers the quality of the saffron. Around 2 percent moisture content is usual with the stigmas brittle to the touch. Drying activates the chemical compounds, which release aroma, colour and flavour. "Hay" is saffron dried in a silk sieve over glowing embers. Gucci is the form of drying where the saffron is tied in bunches and then left in the sun.

The bulb reproduces itself and most commonly is left in the ground of saffron cultivating countries for four years before it is lifted out and replanted in new earth. It appears that countries which export commercial saffron do not allow saffron bulbs to be exported. Thus the Netherlands is a major exporter of saffron bulbs.

## 2. Use

Saffron is used extensively in Central Asia and India for *biryani* and *pilau* rice dishes. India sweets, such as *kheer*, *ras malai*, and the yogurt drink *lassi* also have saffron added. In the West the yellow dye of saffron is used to colour a number of rice dishes such as the different risottos and paellas. Saffron is incorporated into sauces, ice cream and desserts.

A number of European countries use saffron to make a series of celebratory bakery products: saffron bun *Safranbrot* are made on St Lucia's Day 13 December in Sweden, an Easter saffron cake is made in Cornwall, *kulich* is the Russian saffron Easter cake, and the French make a Christmas cake with saffron. In Germany there is a relatively common saffron bread. The famous Provençal fish dish *bouillabaisse* incorporates saffron as do a number of other shellfish and seafood soups. .

Saffron is used to make Swedish Bitters.

Saffron has traditionally been used as sedative, tonic and stimulant, and an expectorant. It is listed in the German Commission E Monographs as a sedative to calm the nerves and as a spasmolytic for alleviating cramps. In recent years a great deal of interest has been shown in the carotenoid properties of saffron and its cancer reducing properties.

Saffron can be used as a natural dye. Because it is water soluble it needs a mordant for the colour to set. In Asia, the yellow dye of saffron is considered the colour of royalty. Buddhist monks wear bright orange-yellow robes dyed with saffron.

In high dosage, saffron exhibits toxic qualities. Thankfully, due to its high price, saffron poisoning is very rare.

### 3. World Production

Commercial saffron production occurs in Spain, Italy<sup>2</sup>, Greece<sup>3</sup>, Turkey, and Morocco in the Mediterranean region, Iran in Central Asia, and Kashmir<sup>4</sup> and Nepal in the Himalayas. Production, albeit in very small quantities, occurs also in Australia<sup>5</sup>, China, Austria<sup>6</sup>, Switzerland<sup>7</sup>, France<sup>8</sup>, California, Myanmar, and the Argentine<sup>9</sup>.

Production data is extremely hard to establish. Its small size means that it usually falls well less than the minimum size required for formal statistical collection. There are two factors affecting the reliability of actual production estimates from the commonly recognised major production centres of Iran and Kashmir.

- The United States has banned the imports of Iranian saffron. This has resulted in Iranian saffron being imported into third countries for re-packing and no doubt re-labelling for onward movement to other destinations. The practice is prevalent among importing countries, especially Spain. The practice also suggest that Iran has an interest in underreporting its production.
- The high value / low volume a characteristic of saffron encourages smuggling, especially out of conflict sensitive Kashmir. Under-reporting of production is a concomitant action with smuggling. In India, the exporting of spices attracts a cess at 0.5 percent of the FOB value (except with respect to exports from units situated in Exclusive Export Zones) under the Spices Board Cess Act 1986 and Agri Produce Cess at 0.5 percent of the tariff value fixed from time to time. Whilst these levels are not considered by themselves to be adequate reason to avoid by smuggling, they fo add to the overall encouragement not to complete all documentation.

References were seen to Iranian production varying from 100 – 170 tonnes<sup>10</sup> to 225 tonnes in the year to March 2004<sup>11</sup>.

Other likely volumes are

- Greece: 5 - 7 tonnes.
- Morocco: 2 - 3 tonnes.
- Spain: 4 tonne
- Italy: 100 kilos

## 4. Grades

### 4.1 Grade characteristics

Saffron is valued for three attributes: aroma, flavour and colour. These attributes are based on three specific chemicals: safranal with aroma, picrocrocin with flavour, and crocin with

<sup>2</sup> Cagliari on Sardinia. *Zafferano del L'Aquila* comes from Abruzzi. Aquilia saffron from Italy is famed for its stigmas' length, its high safranal content, and its strong colouring effect.

<sup>3</sup> In Kozani in Macedonia.

<sup>4</sup> Given the importance of Kashmir, it is useful to note the Hindi words for saffron are *kesar*, *kesari*, *zafraan*, and *zafran*.

<sup>5</sup> Tasmania

<sup>6</sup> In Hollersbach in Hohe tauern.

<sup>7</sup> In Mund in Canton Valais.

<sup>8</sup> In the Loire Valley and in Provence. At one stage France was as big a producer as Spain.

<sup>9</sup> From Mendoza, the saffron is supposed to be dark and pungent.

<sup>10</sup> From [www.saffronspecialist.co.uk](http://www.saffronspecialist.co.uk). The site has an extensive dictionary of A-Z of saffron and a number of books exclusively on saffron. Combined, the site has high credibility.

<sup>11</sup> **Iran Daily**, 6 December 2004, on a story on the crisis in the Iranian industry..

colour. The International Standards Organisation has standards for the measurement of these chemicals – ISO 3236 – 2 Clause 13.

### **Colour**

Saffron has two carotenoids crocetin and crocin. It is crocin (chemical composition: C<sub>44</sub> H<sub>64</sub> O<sub>24</sub>), one of the few naturally occurring carotenoids easily soluble in water, that gives saffron its colour. The water solubility of saffron is one of the reasons for saffron's widely preferred application as a colorant in food and medicine. This is not withstanding the irony that whilst the stigmas are red, their dye is a yellow. The yellow-red carotenoid pigments in saffron remain after the plant has died, thus ensuring that saffron maintains its colour. The water solubility characteristic is also why it is usual to steep saffron in water before using. Recipes vary but a minimum of 20 minutes is recommended whilst some recommended up to 12 hours' steeping.

Perhaps the most important parameters in evaluating the quality of saffron is its colouring power as colour is a strong indicator of flavour. Basically, the higher the colour rating the stronger is its aroma and flavour. Colour is determined by measuring by spectrophotometry the amount of colouring factors present at 443 nanometers.

Kashmiri saffron, considered the world's finest, is an exceptionally dark maroon.

### **Flavour**

The principal element giving saffron its special "bitter" flavour is the glycoside picrocrocin (C<sub>16</sub> H<sub>26</sub> O<sub>7</sub>). Usually the darker the saffron the more intense the flavour.

The ISO minimum standard is 70.

### **Aroma**

Saffron has a strong aroma which is produced by certain special volatile oils and essences. The main chemical responsible for saffron's aroma is safranal. This can comprise up to 70 percent of the volatile components of saffron.

The ISO minimum for safranal is 20.

## **4.2 Grade standards**

The ISO rating for saffron refers to the following:

- Colour strength.
- Bitterness.
- Solubility in water.
- Moisture and volatile matter.
- Total ash.
- Fibre content.

Based on these criteria, the following categories have been developed.

- Category I 190 +
- Category II 150 - 189
- Category III 110 - 149
- Category IV 80 - 109

It is comforting to think that the claim that all saffron exports receive an ISO ranking is true. However, observations in India suggest that this is far from the case. Because of its low volume / high value properties, a great deal of Kashmir's saffron is exported in suitcases. At a merchant's office in Delhi, a group of Egyptian buyers were seen inspecting the samples, after which they purchased the product and carried it out of the country in their suitcases. No reference was made to ISO standards. Instead great reliance was placed on their organoleptic evaluation.

The Spanish saffron industry has developed its own standards that combine the attributes of ISO 3632 with regionality:

- Coupe            190
- Mancha        180
- Rio              150
- Standard      145
- Sierra          110

Coupe means "to cut" and refers to the laborious task of cutting away the yellow stamen. With just the reddest of red tips used, Coupe saffron has a very intense flavour.

Kashmiri saffron commonly has a rating greater than 250.

Sargol is the highest grade saffron from Iran with an ISO rating of 230 – 255. Poshal/ Poushal / Pushali / Pooshali is from Iran. Because a few yellow or lighter parts of the saffron strand are used it is seen as a slightly lower quality compared with Sargol. Thus it receives an ISO ranking of Category 11. Lower grades of 3 Pushali and 4 Pushali are used for mixing.

Mancha is the saffron grown in the five provinces of the La Mancha region in Spain's south east. Using the ISO Standard, Mancha rates between 130 – 190.

Greek Red rates between 198 – 230.

Reference was seen to the following grade standards but it is uncertain how widespread their usage is:

- Grade A: Short stigmas.
- Grade B: Stigmas attached to part of the style.
- Grade C: Stigmas attached to style.
- Grade D: Long stigmas attached to style.

The term "floral waste", is defined by the ISO as "yellow filaments that are unattached and separated, pollens, stamens, parts of ovaries and other parts of the flower of *Crocus sativus* Linnaeus". That is, floral waste consists of the parts of the saffron flower that contain none of saffron's aromatic, flavouring or colouring properties. Floral waste can be present but only in very minute levels. It is identified in the photospectrometry report. Its presence is a means of classifying commercial saffron by quality category.

Saffron is also sold in the powdered form. Whilst arguments were seen that stated that powdered saffron was the most convenient form to purchase and use saffron, grinding saffron threads is seen as being poor economics as a total weight loss of around 18 percent occurs<sup>12</sup>.

<sup>12</sup> Comprising loss of moisture required to allow the product to be ground, loss of weight in the grinding process, and weight loss associated with handling and packing. Source: [www.saffronspecialist.co.uk](http://www.saffronspecialist.co.uk).

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There is also the issue of shelf life with the powdered form. Under proper storage conditions the powdered form is considered to last around a year whereas the whole product as a shelf life of around 10 years.

Saffron is very light-sensitive and hygroscopic and must therefore be well sealed and protected from light during transport. The product is therefore packaged in cans which are in turn packaged in boxes.

Adulteration is common. At one level there is the mixing of high grade saffron with lower grades with the mixture being passed off as the higher grade. There is also the mixing of stigma with stamen. At another level there is the adulteration with non-saffron products such as strands of silk dyed red. Adulteration is more common in the powdered form with the like-coloured turmeric and paprika being added.

### 4.3 Trade terms

Kashmir "Mogra Cream" is considered perhaps the world's finest saffron.

Dasteh is Iranian saffron tied in a bunch.

American or Mexican Saffron refers to the thistles of the flower heads of the safflower plant that grows wild in southern United States and Mexico. The red-orange thistles produce a slight yellow dye but no saffron flavour or aroma in cooking or baking.

## 5. International trade

The following examination draws on data from the P-Map system of the International Trade Centre. In turn, this system uses the COMTRADE Statistics of the United Nations<sup>13</sup>.

In presenting the data, one needs to be conscious of the previous comments regarding the difficulty of establishing hard data for the saffron industry. As is common with a large number of primary products whose production is essentially by small-holders, the ability to capture production data is difficult.

Trade data is different. Here there is usually a formal documentation process that allows for the capturing of export and import activities. This process is usually more precise in developed countries than under-developed one. The ITC data allow for cross-checking of trade data. That is, what Country A says it exports to Country B can be cross-checked with what Country B says it imports from Country A. The case arises where the exporting of Commodity X from Country A to Country B may be very important to Country A but of minor consequence to Country B. Thus data may exist in one country but not in another. This results in challenges. Here a degree of cross-checking can occur through reference to monthly and annual data from the exporting country. The inability to cross-check is a reason to be nervous about certain trade statistics<sup>14</sup>. It is considered that as the ITC has adequate

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<sup>13</sup> My grateful thanks to Mr Bastiaan Bijl, Market Analysis Section of the ITC for his generous cooperation in assisting me with the splendid data base.

<sup>14</sup> In analysing the trade in cordyceps *Cordyceps sinensis*, the decision was made to ignore Chinese data but accept that of Hong Kong because of the lack of a cross-checking mechanism. See Vinning G and Tobgay S. 2004. **Cordyceps: a market analysis**. Agricultural Marketing Services, Ministry of Agriculture, Thimphu, Kingdom of Bhutan.

cross-checking mechanism its data is reliable. It is for that reason that heavy reliance is made on the trade data of the ITC<sup>15</sup>.

The issue with saffron trade data is that the actual reporting process from the reposting countries is unreliable. The two main producers, Iran and India, have significant reasons to under-report their trade in saffron. With Iran, there is trade ban imposed by the United States. With India, there is the conflict in Kashmir. Spain has a widely acknowledged re-packaging industry. The United Arab Emirate is an acknowledged re-exporter. For this reason there is little correlation between the assessment of production and the confirmed trade data. A final challenge is that the small volume involved are difficult to be identified in the usual data collection method.

Within the limits of these severe caveats what trade data that is reported is processed by the COMTRADE / ITC systems. This caveat is important in presenting the following examination.

## 5.1 Exports

### 5.1.1 World

Even with the heavy caveat expressed above, the world trade figures for saffron defy explanation. According to the data, the world's largest exporter of saffron is Indonesia who in 2003 exported 313 tonnes at an average price of US\$2.24 /kg, followed by Ethiopia with 221 tonnes worth an average price of US\$0.36 / kg. If these clear anomalies are discounted then the data makes sense.

#### SAFFRON - World. Major exporters, 2003

Country	Volume (tonne)	CIF price (US\$ / kg)
Spain	159	157
Iran	141	472
China	79	8.78
France	26	36
Greece	9	234
India	7	93
Italy	7	111

The low value of Indian exports in the face of the widely acknowledged supremacy of Kashmiri saffron can be explained by the fact that India has a domestic huge market capable of paying saffron's high prices. A great deal of high quality Kashmiri product is blended with lower quality Iranian product which lowers the average price. What is exported is both the lower quality mixed product and the very low quality product that is not even used in the mixing process. India / Kashmir's high quality product is usually exported in carry-on suitcases and thus does not enter the formal exporting documentation process.

### 5.1.2 Iran

The bulk of Iran's saffron exports go to the two acknowledged re-exporters.

<sup>15</sup> See Vinning G, Tobgay S, Tshomo K. 2004. **World turmeric markets**. Ministry of Agriculture, Thimphu, Kingdom of Bhutan

Vinning G. 2004. **Demand for cardamom: a macro analysis**. SNV. Thimphu, Kingdom of Bhutan

**SAFFRON – Iran. Exports by destination. 2003**

Country	Volume (tonne)	CIF price (US\$ / kg)
United Arab Emirates	60	434
Spain	39	449
Italy	6	478
France	4	436
Sweden	2	627
Switzerland	3	397
Kuwait	2	368

The Iranian data makes no mention of its product going to India / Kashmir. Yet in Kashmir and Delhi the practice of mixing was widely acknowledge.

**5.1.3 Spain**

Spain exports to over 20 countries. The ten major destinations for Spanish exports are shown below.

**SAFFRON - Spain. Exports by destination. 2003**

Country	Exports (tonnes)	CIF price (US\$/ kg)
World	70	312
United States of America	9	498
Italy	3	696
United Arab Emirates	2	954
Taiwan, Province of (China)	4	473
Saudi Arabia	4	375
United Kingdom	8	176
Sweden	2	557
Switzerland	5	221
Japan	1	943
France	3	202

**5.1.4 India**

The reporting of its export data by India is far from complete. The overall figure does not cross-check with individual country data.

**SAFFRON - India. Exports by destination. 2003**

Country	Exports (tonnes)	CIF price (US\$/ kg)
World	6	88
Nepal	1	306
Spain	1	122
United States of America	1	72

### 5.1.5 Greece

In 2003 Greece reported detailed exports of just three tonnes to Spain at an average price of US\$482 /kg. In 2002 exports also went to Switzerland, Sweden, France, Germany, and Norway but details are not available for 2003.

## 5.2 Imports

Since imports of saffron tend to be into the developed world, their reporting tends to be more accurate.

Importers fall into two groups: the large volume importers and the high priced importers.

### SAFFRON – Imports. High volume: 2003

Country	Exports (tonnes)	FOB price (US\$/ kg)
France	74	42
United Kingdom	74	18
United Arab Emirates	73	474
Spain	66	293
Saudi Arabia	45	56
Denmark	28	10
Oman	28	16

It is interesting that the UAE and Spain, the two acknowledged re-packers and exporters, pay a vastly higher rate for their imports compared with the others volume importers.

### SAFFRON – Imports. High value: 2003

Country	FOB price (US\$ / kg)	Exports (tonnes)
Japan	636	3
Kuwait	559	2
Sweden	497	6
Argentina	491	2
UAE	474	73
United States of America	419	15
Italy	392	22

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### 5.2.1 Spain

In 2003 Spain reported importing 34 tonnes from Iran at an average FOB price of US\$414 / kg and three tonnes from Greece at an average FOB price of US\$487 / kg.

### 6. Comment